

Britain. He was a remarkable man in many respects, and was quite prominent here. Being a self-made man of strong character, and exercising vast influence, there is not a little in his career which is remarkable, and not a little which commends itself to the young man struggling for a place in the world—commends itself because of the perseverance manifested under trying circumstances, and for the acquisition of information obtained in difficulties. (Salt Lake Herald of October 25, 1881.)

The following notes are taken from the Church Chronology:

July 30, 1837—Nine persons were baptized in the river Ribble, at Preston, England, as the first converts to the fulness of the gospel in England. Geo. D. Watt was the first person baptized.

Feb. 21, 1844—A meeting of the Apostles was held at Nauvoo for the purpose of selecting "a company to explore Oregon and California and select a site for a new city for the Saints." Jonathan Dunham, Phineas H. Young, David D. Yearsley and David Fullmer volunteered to go; and Alphonso Young, James Emmett, Geo. D. Watt and Daniel Spencer were requested to go.

The ship "Ellen Maria" sailed from Liverpool, England, with 378 saints on board, under George D. Watt's direction. Apostle Orson Pratt and family also returned with that company. The ship arrived at New Orleans April 6th.

Surveying in Pioneer Utah

1847
"After our return to camp, President Young called a council of the Quorum of the Twelve. There were present, Brigham Young, Heber C. Kimball, Willard Richards, Orson Pratt, Wilford Woodruff, George A. Smith, Amasa Lyman and Ezra T. Benson.

"We walked from the north camp to about the center between the two creeks, when President Young waved his hand and said, 'Here is the forty acres for the Temple, the city can be laid out perfectly square, north and south, east and west. It was then moved and carried that the Temple lot forty acres on the ground where we stood. It was also moved and carried that the city be laid out into lots of ten rods by twenty each, exclusive of the streets, and into blocks of eight lots, being ten acres in each block and one and a quarter in each lot.'

Other decisions included that each street be laid out eight rods wide and that there be a sidewalk on each side, twenty feet wide. Each house was to be built in the center of the lot, 20 feet from the front in order to secure a uniformity throughout the city. It was adopted that allotment be made for four public squares of ten acres each, in different parts of the city, to be used for public parks. The apostles were made a committee to superintend the laying out of the city. So August 2 Orson Pratt assisted by Henry Sherwood started the preliminary survey. It was found that forty acres for the temple grounds would be too large, a meeting was called and the acreage was reduced to ten.

"Not many seasons elapsed after the pioneer year, 1847, before the main City of the Saints, which served as a model for scores, with its wide and regular streets flanked with shade trees, neat substantial buildings, empowered in groves and gardens, crystal streams fresh from the towering snow-crowned hills, flowing down both sides of its charming and healthful thoroughfares presented the appearance, especially in the summer when

orchards were all in bloom, of one vast variegated bouquet, radiant with beauty and redolent of mingled perfumes."—Whitney.

August the 7 the Apostles met on the Temple block and this time selected their "inheritances." President Young took the block east of the Temple, Heber C. Kimball took the north block, while Orson Pratt selected the block south of the Temple. Likewise the other pioneers selected or were given land upon which they were to build their homes.

Beyond the city limits the land was divided in 5 acre plots, then 10 acres and further from the city limits in 20 acre plots. This method prevented one man from having large holdings near the city.

HENRY SHERWOOD

Although mentioned in the early days of Utah, very little history can be found on the life of Henry Sherwood. The fact that he acted as commissary general of the first pioneers who crossed the plains indicates that he was a trained and educated man. A few days after the arrival of the pioneers in the valley he assisted Orson Pratt in the first survey of Salt Lake City. In 1850 he was elected to the position of Surveyor General of the State. In 1852 he was called to San Bernardino where he died before 1862.

JOSEPH L. HEYWOOD

On the 15th of March, 1849, a convention was called for the purpose of organizing the State of Deseret, Joseph L. Heywood was one of the committeemen chosen to draft a constitution. This constitution was accepted by the people and on March 12, 1849, a State election was held and Joseph L. Heywood was chosen as Surveyor of Highways.

In speaking of his surveying Mr. Heywood wrote:

"In the spring of 1851 I accompanied President Brigham Young and Heber C. Kimball and Apostle Ezra T. Benson on their visit to Parowan, and was appointed to form a settlement on Salt Creek (now Nephi, Juab County). I assisted the Territorial surveyor, Jesse W. Fox, in laying out the city of Nephi, where I presided for three years." (Andrew Jensen's *Biographical Encyclopedia*, Vol. 1, p. 646.)

W. W. PHELPS

"Wm. W. Phelps crossed the plains to Salt Lake Valley in 1848, and on the journey he composed a song entitled, "The Saints Upon the Prairie." After his arrival in the Valley he became as active as he had been in the East. When the Provisional Government of the State of Deseret was organized March 4, 1849, he was appointed to serve on a number of important committees, and was also on a committee appointed to draft and report to the convention a constitution under which the inhabitants might organize and govern themselves until the Congress of the United States should otherwise provide by law. He also served on a number of canal committees and was appointed surveyor-general and chief engineer of the Provisional State of Deseret, April 5, 1849.

"When Parley P. Pratt's exploring company was organized in November, 1849, to explore what is now southern Utah, Wm. W. Phelps was chosen as first counselor to Parley P. Pratt, and on the journey he rendered efficient aid to the expedition, taking a most active part in every important matter. Thus, together with Dan Jones, he made astronomical observations in regard to latitude, longitude, etc. . . .

"One of the enterprises which made the name of Wm. W. Phelps famous in the early days of Utah was the publication by him of the so-called 'Deseret Almanac,' the first of which was issued in 1851. This meritorious publication gave astronomical observations suitable for the latitude and longitude of the Territory of Utah and much other valuable information. He was a prominent member of the Deseret Theological Institute, which was organized in Salt Lake City, in 1855. He also became prominently associated with the Deseret Horticultural Society organized in 1855. He died March 7, 1872, at his home in Salt Lake City, Utah." (*Biographical Ency.*, Vol. 3, p. 696.)

JESSE W. FOX, SR., PIONEER SURVEYOR

The land occupied by settlers in Utah prior to 1869 lay within the unsurveyed public domain. In that year a Federal land office was opened and it became possible for residents of Utah to acquire legal title to the lands they had occupied for as long as twenty years as squatters. Such rights as they had were based upon possession evidenced in the first instance by a surveyor's certificate. As soon as possible after the establishment of a settlement an authorized surveyor set off to the heads of families the city lots and contiguous farm and pasture lands. It is evident that there was a good deal of surveying to be done in running lines for original and subsequent settlers in rapidly growing communities.

The first land surveying in Utah was done by Orson Pratt and Henry G. Sherwood. The former on July 31, 1847, established by astronomical observations base and meridian lines at the site selected for the Temple block and three days later the two began running the lines of the city plat. (Plat A.)

The man who was to become first in historical importance among Utah surveyors of the pioneer period, Jesse Williams Fox, had been prevented by illness from accompanying President Young to the Salt Lake Valley in 1847 and did not arrive until two years later. He quickly rose to official prominence and had more to do with the laying out of townsites and the running of lines for canals, highways, and railroads than any other person.

Jesse Williams Fox was born March 31, 1819, at Adams Center, Jefferson County, New York, the son of Samuel Fox, a well-to-do farmer, and Lucy Williams. He was engaged in teaching school when he became a convert to the L. D. S. Church and decided to cast his lot with the Saints at Nauvoo, where he arrived in June, 1844, immediately after the martyrdom of Joseph and Hyrum Smith. He resumed his occupation of teaching at Nauvoo and had for a student Eliza Gibbs, whom he subsequently married at Council Bluffs in 1849.

The work of Jesse W. Fox as a surveyor in Utah began immediately after his arrival in the Salt Lake Valley in 1849, when he assisted William M. Lemon in the survey of city lots and adjacent farming lands. This activity was interrupted by a call to accompany Isaac Morley and his selected party of colonists to establish the first settlement in the Sanpete Valley. He taught the first school at Manti and had among his pupils an Indian youth who as Chief Black Hawk fifteen years later waged a costly war on the white settlers in Central and Southern Utah. The kindly disposition for which Jesse Fox was noted left a lasting impression on the Indian boy and when his old teacher was captured by one of Black Hawk's foray parties

he was warmly greeted by the Chief and given safe conduct to his destination.

The plans of Mr. Fox to settle at Manti were set aside by President Brigham Young who requested that he remain in Salt Lake City and give his attention to surveying. It may be that Governor Young had in mind the advancement of the young surveyor to the office of surveyor general as soon as circumstances were favorable. The office had been created in 1849 when the provisional government of the State of Deseret was established and W. W. Phelps was its first occupant. He was succeeded by Henry G. Sherwood who was elected by the legislative assembly in accordance with an act approved March 2, 1850. Under the terms of the act the surveyor general was to serve for a term of two years and was to "have general superintendence and supervision of all surveys of land made within the State." He was to "keep a record of all surveys made by himself or reported to him by other surveyors in a book suitable for the purpose." This book and others like it have disappeared and with them much valuable information of historic importance. The act further provided that "in all new surveys certificates approved by authorized surveyors shall be considered title of possession to the holding of the same for the amount of land therein described." Sherwood moved to San Bernardino in the summer of 1852 and Fox succeeded to the office and was continuously re-elected until the office was abolished by legislative act in 1884. As surveyor general Jesse W. Fox issued hundreds of land certificates that became the basic evidence of title. The surveyor general received compensation from the Territory (the amount is not known) and the established fees for making private surveys. A schedule of fees was fixed by law in 1852 in an act providing for surveyors in every county, running from \$2 for surveying twenty acres to \$8.50 for surveying six hundred and forty acres, with 10 cents a mile for travel expenses.

Evidently the office of surveyor general did not require full time, for Jesse W. Fox, following the organization of the municipal government of Great Salt Lake City (1851) was elected by the council to the office of city surveyor and served until 1876 when he was succeeded by his son, Jesse W. Fox, Jr. In this office his remuneration in 1860 was four dollars per day for actual days employed.

Meanwhile his well-recognized abilities and sound judgment led to his appointment to many public responsibilities, both for his Church and for the Territory. The territorial legislature having approved a recommendation of Governor Young to locate the capital near the geographic center of the territory, Mr. Fox was appointed a member of a commission, of which the other members were Orson Pratt, Albert Carrington, and William C. Staines, to choose an appropriate site. Accompanied by Governor Young and other notables the commission selected the present site of Fillmore, October, 1851, and Mr. Fox ran the lines for the future city. In 1852 by appointment of the Great Salt Lake Court Mr. Fox was associated with Orson Spencer, and Albert Carrington in determining the qualifications of school teachers and granting certification.

In 1853 (February 14) Jesse W. Fox in the presence of assembled citizens and Church authorities surveyed the site for the Salt Lake Temple, the starting point having been designated by President Young.

The following is quoted from the message of Governor Young, December 11, 1855:

"The northern line of Utah has also been established, during the

present season, by Professors Orson Pratt and Albert Carrington, and the Territorial Surveyor-General, Jesse W. Fox, where it crosses the Malad, and by Professor Pratt and Surveyor-General Fox, where it crosses Green River and the emigrant road east of the last named stream. There was no accompanying party from Oregon in either of the above cases, as the information was mainly desirable for determining the jurisdiction of this Territory, at points where Oregon had no settlements within hundreds of miles."

In the spring of 1857 Mr. Fox was one of three engineers accompanying President Young and party to the Salmon River Mission at Fort Lincoln. Distances and directions were carefully made under the supervision of Mr. Fox using two brass Odometers. In a determined distance of 378.94 miles there was a variance of only one-half mile in the two measurements. In 1861 Mr. Fox headed a party that opened a road into the Uintah Country and made observations for use in directing colonization in that area.

With the completion of the Pacific railroads in 1869, Brigham Young and other Utah capitalists constructed the Utah Central Railroad to connect Salt Lake with those lines. Jesse W. Fox was employed as engineer in this enterprise. Mr. Fox is mentioned as a stockholder in the Utah Southern Railroad running from Salt Lake through Provo to Juab, which he also served as Chief Engineer; in like capacity he was employed in the construction of the Utah Southern Extension Railroad to 'Frisco. In 1881 all three lines were consolidated and Mr. Fox became chief engineer of the system.

A word about the character of Jesse W. Fox. He was one of the most unselfish of men. With unusual opportunities to amass wealth through speculation in lands, he had no inclination to do so. A stepson, Mathias F. Cowley, says: "I have heard my respected stepfather, Jesse W. Fox, say that he surveyed many of the cities and much of the land between Logan and St. George, a distance of over 400 miles, and the desire to select a town lot or a farm lot in any of the places for speculative purposes never entered his heart; and if anyone asked him to select one for him, he promptly refused, saying that those who owned the land should be the builders on it and that no one by his assistance should ever speculate at the expense of the poor Saints coming to the Valley to serve God and keep His commandments." His son, Jesse W. Fox, Jr., relates the following circumstance: "Father once became possessed of forty acres of land just west of the present town of Bountiful which cost him \$15. My mother's uncle desired to purchase it and offered a cow valued at \$30. Father said, 'You can have the land. It cost me but \$15 and that is all I will charge you.' He took the cow and paid Uncle Daniel Carter \$15 to boot. The land for many years past has been worth \$500 an acre."

A contemporary, Apostle Franklin D. Richards, one of the speakers at the funeral services of Jesse W. Fox, paid the following tribute:

"I wish to remind my hearers that he was not only acquainted in Salt Lake City, but his profession as a surveyor—as the Surveyor General—made him to be acquainted with every part of this Territory. I had occasion with others to call his services to our aid in locating the towns and cities in the north with which I was associated in a judicial capacity. He was a man who was careful of every brother's rights, and his compass was adjusted as nearly accurate as any man's as we have been able to find. I cannot help but feel that if Brother Fox should still be a surveyor again,

and should have to do with running off some of the stakes and boundaries and metes of the inheritances of the righteous, I would as leave he would run the chain and set the stakes for my inheritance as any man I know of."
—F. Y. Fox.

ALBERT CARRINGTON, THE SURVEYOR

Albert Carrington, who was born Jan. 8, 1813, in Royalton, Vermont, was one of the few college graduates to be numbered among the Mormon Pioneers who came into the Salt Lake Valley in July, 1847, he being a graduate from Dartmouth College in the year 1833. It must have afforded him great pleasure to associate with Capt. Howard Stansbury after his arrival in the valley Aug. 28, 1849.

In April, 1849, orders were issued by the United States Government to organize an expedition, under the Bureau of Topographical Engineers, for the sole purpose of making a survey of the Great Salt Lake and an exploration of its valley. The man placed in charge of this expedition was Howard Stansbury, Captain, Corps Topographical Engineers, United States Army. On May 31, 1849, with seventeen men, five wagons and forty-six horses and mules the group left Fort Leavenworth and after undergoing the usual hardships of traveling in those days, arrived in Salt Lake City, August 28, 1849.

Captain Stansbury called at once upon President Brigham Young, explaining the purpose of the expedition and quieting the rumors that had preceded them, to the effect that they were coming with the ulterior purpose of breaking up and destroying this colony. I shall use Captain Stansbury's own words for the result of the call.

"So, soon, however, as the true object of the expedition was fully understood, the president laid the subject-matter before the council called for the purpose, and I was informed, as the result of their deliberations, that the authorities were much pleased that the exploration was to be made; that they had themselves contemplated something of the kind, but did not yet feel able to incur the expense; but that any assistance they could render to facilitate our operations would be most cheerfully furnished to the extent of their ability. This pledge, thus heartily given was as faithfully redeemed; and it gives me pleasure here to acknowledge the warm interest manifested and efficient aid rendered, as well by the president as by all the leading men of the community, both in our personal welfare and in the successful prosecution of the work."

Matters being thus satisfactorily adjusted, Captain Stansbury left the City on September 12th for Fort Hall to procure supplies for the party. Before leaving the City however he secured the services of Albert Carrington. Of this incident I again quote Captain Stansbury's Report:

"Before leaving Salt Lake City for Fort Hall, I had engaged the services of Albert Carrington, Esq., a member of the Mormon community, who was to act as an assistant on the survey. He was without experience in the use of instruments; but being a gentleman of liberal education, he soon acquired, under instruction, the requisite skill, and by his zeal, industry, and practical good sense, materially aided us in our subsequent operations. He continued with the party until the termination of the survey, accompanied it to this city, and has since returned to his mountain home, carrying with him the respect and kind wishes of all with whom he was associated."

Continuing Albert Carrington's career with this expedition the fol-

lowing mention are noted in the same report. Mr. Carrington was often left in charge of the camp as on April 26th; many of his reports were used by Captain Stansbury such as his report of the range west of Dolphin Island. The fact that he took active part in the survey comes to light under an entry of May 18th, when Captain Stansbury writes: "The eyes of my assistant, Mr. Carrington from exposure to the intense glare of the sunlight from the white sands, have become much inflamed, and I was fearful, at one time, that he would be unable to continue the performance of his duties. He was much better today, however, and returned to the line of the survey." And again under Sunday, June 9th: "Mr. Carrington came in with his party a little after sunrise. They had struck from the flat to the north point of the range, instead of the peninsula to the north of it, which intervening between them and our campfires, had concealed us from their view. Not finding the camp, as they expected, they had followed along the shore (which here turns toward the southward) for five miles in search of it; but being disappointed, had returned to the point which they had first reached, kindled a fire, and laid down on the sand for the night, without either blanket or food. They did not see our signal fires before reaching this point, as their faces were turned to the south, and when they did descry them, were too much exhausted to come in. They had suffered much from want of water but were in good spirits."

On June 26, 1850, the actual survey of the lake was finished but some of the party remained until Aug. 16 making a final check, on the station, that they had erected on the various islands.

One of these islands directly west of Stansbury Island, was named after Albert Carrington and to this day is known as Carrington's Island. It is about eight miles in circumference, exclusive of the flats, which stretch out from it to the southward and westward, and which are more extensive than the island itself, being terminated on the west by a rocky reef. This island was found to have considerable quartz rock seamed with white and ferruginous quartz. It also abounded in segos and a great many other plants.

The survey took three months but the following summary exhibits the amount of work done in prosecuting this examination:

1. The selection and measurement of a base line, six miles in length.
2. The erection of twenty-four principal triangulation stations, the lumber for many of which was hauled a distance upward of 30 miles. Many of these, put up in the fall of 1849, had to be renewed in the summer of 1850, having been torn down and used for fuel by the Indians during the winter, as well as by some of the inhabitants, who probably supposed they had already fulfilled the purpose for which they were erected.

Miles.

3. The survey of the Great Salt Lake, the shoreline of which, exclusive of offsets, extends to.....291
4. The survey of the islands in the lake..... 96
5. The survey of Utah Lake..... 76
6. The survey of the River Jordan, connecting the two lakes, and some tributaries 50

Making in all.....513

7. The observations from different triangular stations, extending from the northern extremity of the Salt Lake to the southern boundary of

the valley of Lake Utah, comprising an area of more than five thousand square miles, and involving the necessity of traversing a large extent of country, both by land and by water.

The triangulation of the valley south of the Salt Lake and the observation for the azimuth of the base line were finished on the 12th of August, and the time until the 28th busily occupied in preparation for our return.

The lake survey was a wonderful opportunity for Mr. Carrington, even if in his latter years he was crippled with rheumatism, no doubt started by the drenchings, the nights spent without covers on the damp sands, the meals of nothing but raw bacon, for here he learned to use the instruments and continued for years to serve the commonwealth with this knowledge. His friendship with Captain Stansbury was deep and long lasting. His former home (now preserved in the Temple Square in Salt Lake City, Utah,) a crude log cabin, was used for Captain Stansbury's headquarters and as such is so labeled.

In 1853 it was decided to wall the city with a good ditch upon the outside of the wall, the wall to be built of mud taken from the ditch, and mixed with straw, or hay, and gravel, and laid up in courses as deep as the consistency of the mud would allow, to be repeated when the previous course was dried until the wall was finished. This was deemed to be the cheapest, and in the end, the most durable method that they could afford at that time. The City Council appointed Albert Carrington, Parley P. Pratt and Franklin D. Richards, a committee to locate the line of said wall and report thereon, on Saturday, August 27, 1853. They duly presented the following report after making a survey of the ground:

"REPORT:—We recommend that the inner line of the wall commence at a point eight rods south of the southeast corner of lot three, in block one, of plot B, thence due north 536 rods, including two blocks, and two streets north of the present survey, thence due west about 408 rods to the east line of the 1st East Temple street, thence northwesterly about 287 rods to a point near the northeast corner of the block upon which the public bathhouse is located, thence due west about 472 rods to the river Jordan, thence up the east bank of said river to a point where said line would intersect the west prolongation of the north line of the five acre lots, thence due east, about 1,028 rods to the point of beginning, making in all 2,731 rods, exclusive of the west, or Jordan river.

All of which is respectfully submitted by Albert Carrington,

Parley P. Pratt,

Great Salt Lake City, August 27, 1853.

Franklin D. Richards.

Albert Carrington died in Sept., 1889, at the age of 76. He loved this commonwealth; he had helped to lay out its wide, orderly streets, its blocks divided into home and garden lots, like neat little lights in a window, were a source of pleasure and pride. Whatever he contributed of his knowledge of the use of the instruments and the calculations necessary to carry out the plans, he did sincerely and gladly.—*Josephine J. Woodruff Sarle.*

DAVID H. BURR

"In December, 1853, President Pierce recommended that the national land system be extended over Utah with such modifications as the peculiarities of that territory might require. On February 21, 1855, an act was passed by Congress authorizing the appointment of a surveyor general for

Utah with authority to survey the lands of that territory, and stipulating that before such lands were to be placed for sale on the public market, sections sixteen to thirty-six of each township were to be reserved for school purposes and that two full townships were to be set aside for a territorial university. The Legislative Assembly of Utah had memorialized Congress for such legislation as early as March 6, 1852.

"David H. Burr was appointed surveyor general for Utah. He arrived in Salt Lake City, July 27, 1855, and immediately entered upon the discharge of his duties. Besides making a thorough survey of Great Salt Lake Valley, he extended reconnaissances of the country north to Cache and Malad valleys, west to Tooele and Rush Valleys and south as far as the Sevier River. As no provisions had been made for the neighboring valleys, he urged Congress that such a project be authorized in order that every settler could procure a share of the valuable timber so abundant in them."

Mr. Burr did not complete the survey but returned to Washington in 1857. His survey covered about two million acres at a cost of \$90,000. Mr. Burr was succeeded by Samuel O. Stambough who continued the survey in June, 1859. (Information from *Utah and the Nation*.)

J. FEWSON SMITH

Born in Preston, England, Jan. 1, 1834, arriving in Salt Lake City, Oct. 4, 1864.

In the spring after his arrival he followed the profession of civil engineer, which he had studied and had become proficient, before leaving England. His first position was that of assistant engineer on the location and construction of the Union Pacific, then building through Echo canyon, and on from Ogden to the Promontory. During his connection with this work he reported favorably upon the plan to cross the lake instead of going around by way of the Promontory, but on account of the additional cost of construction the decision was made to build around; and it was not until late years that his bold plan has been realized by the building of the Lucin cutoff west of Ogden. After the completion of the Union Pacific, with which he was associated until the junction with the Southern Pacific was effected in 1869, his life work was among the railroads of the intermountain country.

He was prominently connected with the construction of a number of Utah railroads, among which may be mentioned the Utah Central, now the Oregon Short Line, between Salt Lake and Ogden, also in 1872 the narrow gauge railroad which ran into the American Fork canyon. In the following year he commenced the construction of the road into Bingham canyon. In 1875 he was chief engineer and one of the principal promoters of the Pleasant Valley railroad, also a narrow gauge, running from Springville to the coal fields at Pleasant valley. He was also connected with the Salt Lake and Eastern road through Parley's canyon, and its branch through Fort Douglas into Red Butte canyon (built to transport building material to the city), but since removed; the Ketchum branch of the Oregon Short Line, and the original Utah & Western to Stockton, now a part of the San Pedro system.

He made explorations from time to time of the mountains lying between Utah and the Pacific coast, and was very enthusiastic in his reports of the riches of the Nevada hills.

In 1891 he went to Mexico where he interested himself in the projected railroad from Deming, N. M., into the mining sections of Chihua-

hua. And in 1895 he explored the route for a New York syndicate from El Paso, Texas, to the Mormon colonies in northern Mexico. This road he immediately afterwards built under the name of the Rio Grand, Sierra Madre & Pacific. It is now owned by the Green interests of Cananea, Mexico, and is being extended to Topolobampa bay, on the Gulf of Lower California.

Mr. Smith's talents and abilities found scope in other directions besides railroad building. He was for many years deputy mineral surveyor, and many of his original locations are now among the most profitable mines of the state.

In 1888 he was elected a member of the city council of Salt Lake, from the Fourth precinct, and was re-elected in 1890, being the only one of the old council to be returned. While in the council Mr. Smith was made chairman of the water commission, and as such conducted a thorough and systematic examination of the water problem for the city, and made a valuable report upon it, outlining in general the same plan which has since been followed in improving and increasing the city's supply. He died May 5, 1909, in Salt Lake City, Utah.

The following items add interest to the life of Mr. Smith:

"A fire occurred a few days ago at the camp of construction engineer J. Fewson Smith, four miles below the mouth of Echo, by which a tent, bedding, boxes and other 'et cetera' were released to their original element among the 'self-moving forces of the universe.' Happily, none of the estimates of work, grade records, cross-section books, or other valuables, the archives of railroad building in Utah, were consumed. The fire originated from a spark of a campfire." (*Journal History*, 28 Sept., 1868.)

"The company are now engaged in perfecting preliminary lines for the construction of the permanent bridges to replace present temporary trestle work. Assistant Engineer J. F. Smith is in charge of this work in Echo canyon, and is pushing the construction with his accustomed accuracy and energy." (*Journal History*, 30 March, 1869.)

"The construction of the permanent bridge abutments in Echo canyon is under the immediate direction of Engineer J. Fewson Smith. Some thirty-four bridges are to be put up from the first crossing to the mouth of the canyon; all the masonry to be of first-class work." (*Journal History*, 27 April, 1869.)

The following is a quotation from *The Revised Laws of Utah*, published in 1855:

CHAPTER IV—AN ORDINANCE CREATING A SURVEYOR-GENERAL'S OFFICE, &C.

SEC. 1. Be it ordained by the General Assembly of the State of Deseret: That a Surveyor General for the State shall be elected by the General Assembly, whose term of office shall be two years, and until his successor is qualified.

SEC. 2. The Surveyor General shall take an oath of office, and give bond and security to be approved by the Secretary of State, and filed in his office.

SEC. 3. The Surveyor General shall keep his office at the seat of government, and keep a record of all surveys made by himself or reported to him by other surveyors, in a book suitable for the purpose. He shall also have a general superintendence and supervision of all surveys of land made within the State.

SEC. 4. It shall be the duty of the Surveyor General, and all County

Surveyors, to supervise all surveys made in their respective jurisdiction, that the same may be accurate, and no report shall be filed for record until the same shall be certified to by the Surveyor General, or County Surveyor, as being correct.

Sec. 5. All surveys made in the State shall be made to correspond with the original survey of Great Salt Lake City, and in all new surveys certificates approved by authorized surveyors shall be considered title of possession to the holding of the same for the amount of land therein described.

Approved March 2nd, 1850.

Orson Pratt, the Astronomer

In 1846 John Taylor, Orson Hyde and Parley P. Pratt were sent to England to supervise the British Mission. On one occasion John Taylor visited Paris, at which time he purchased a set of scientific instruments to be used in astronomical observations and by which longitude, altitude, and latitude could be measured. He also bought a set of surveying instruments. This list included two sextants, two artificial horizons, two barometers, one circular reflector, several thermometers and a large telescope. They were all of the best of make.

The pioneers were encamped on Elk Horn ready for their departure for the West when Brother Taylor arrived with the instruments. Orson Pratt is said to have been the only scientific man in the group so President Young gave the instruments into his care. From then on Orson Pratt acted as scientific guide, establishing the best route, measuring distances and selecting camping places. He became known as the "Pioneer of the Pioneers." As they neared their mountain home, he was selected to lead the vanguard into the valley. Speaking of his first sight of Salt Lake valley, Brother Pratt said:

"I gazed on the surrounding scenery with peculiar feelings in my heart. I felt as though it was the place for which we had so long sought."

It should also be said that Elder Orson Pratt was the chief scholar and scientific man produced by the church in the new dispensation; and while self taught he made such progress in his chosen profession of Mathematician that he was recognized as making original contributions to science. Two editions of the *A Key to the Universe* is, for those of sufficient learning to comprehend it, a valuable treatise on the mysteries of the universe, just now occupying so much attention of the modern men of science.

PREFACE TO THE KEY TO THE UNIVERSE, OR NEW THEORY OF ITS MECHANISM

"A new theory of the mechanism of the universe is propounded by the author, not with a design of subverting, or, in the least degree, interfering with the great law of universal gravitation. On the contrary, it is intended to greatly extend the universality of that law. Modern astronomers and scientists have excluded the immense ocean of ethereal substance from the catalogue of gravitating matter: thus limiting the grand discovery of Newton, intended to be universal, to such gross materials only, as they may consider endowed with the gravitating power. The aim of the author, therefore, is to vindicate the *universality* of the law: to rescue it from the en-

vironed limits sought to be thrown around it: and to give it that unlimited freedom of action, which the distinguished name, '*Universal*,' so appropriately and definitely imports.

"A new theory of celestial mechanism is, at first, startling to those who have not given the subject their special attention. They have unhappily formed an idea, that all the varied phenomena of the universe can be accounted for, by the grand discoveries already made. But this erroneous notion is not general. Mathematicians and the able expounders of the Newtonian system, have clearly pointed out numerous outstanding and very important movements, among celestial bodies, which cannot be explained without the aid of some new theory. Hence, La Place and others introduced the 'Nebular Hypothesis,' which seemed, for a time, to render sufficient cause for certain movements observed. But, as astronomy advanced, the hypothesis weakened: and recent observations prove its total inefficiency, as a cause, to expound the phenomena alluded to. Hence, the astronomical world is again at sea, without 'rudder or compass' to guide them, in respect to the causes which have hitherto so perplexed their most skillful navigators.

"Astronomical science, in its present advanced condition, needs a theory which will answer, as far as possible, the following reasonable questions:

First,—Why are the orbital movements of planets, asteroids, and satellites, in the solar system, in one general direction, namely, from west to east, instead of moving indiscriminately in all directions?

"Second,—Why do planetary bodies rotate upon their respective axes? Why do they rotate from west to east, instead of the contrary direction? Is there any law governing their diurnal periods?

"Third,—Why do the eccentricities of planetary orbits differ? Why do the orbits so closely approximate circular forms? Will they eventually become circular? Were they once greatly elongated, like those of comets?

"Fourth,—Why are the planes of planetary orbits confined within the narrow limits of the Zodiac? Why are they slightly inclined to each other? Will they ever become co-incidental? Did their inclinations ever have a far greater range than they now have? Did any of the planets ever revolve in retrograde orbits?

"Fifth,—Why do not the planes of diurnal rotations co-incide with the respective orbital planes? Did these planes ever co-incide. If so; are there any causes which will compel them into a future co-incidence?

Sixth,—If the satellites of Uranus were originally detached from the primary by rotation and condensation, according to the prevailing hypothesis, why have they a retrograde motion in their orbits, contrary to that of all others in the system?

"Seventh,—If the 'Nebular Hypothesis' be true, how is it possible for the inner satellite of Mars to revolve around its primary three times while the planet rotates but once?

"Eighth,—Observation seems to indicate, that there is an intra-Mercurial planet, so near the Sun, as to have a period less than the solar rotation; how can this be possible, if the theory of La Place be true?

"Ninth,—Will cometary orbits ever be converted into those of a planetary form?

"Until a theory is propounded sufficiently comprehensive to include, at least, partial answers to the above questions, we may consider the great